# Wear are we going?
# The Future of the Police Uniform

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Imagine an officer responding to a barricaded subject call with an armed suspect who reportedly is in possession of a toxic substance. As the officer exits his or her vehicle, the Heads Up Display (HUD) attached to his ballistic helmet provides a complete diagram of the building and a photograph of the involved subject. The helmet also contains a live video feed, which provides responding units and supervisors a first-hand view of the situation. Upon approaching the building, sensors woven into the officer's uniform detect the presence of anthrax, and a protective air purifying respirator is automatically deployed from the helmet. The officer retreats to a position of safety and waits for the arrival of the SWAT Team. SWAT arrives in short order, fully outfitted in personal protective equipment, and is able to safely take the suspect into custody. How far from reality is this scenario? Probably a lot closer than most would think.

The law enforcement profession has an abundance of issues requiring significant study and concentration. Examples include the use of lethal force, pursuit practices, recruitment and retention, and leadership training. All of these are important; none more so than the safety of police personnel as they deploy to protect others. Officer safety has been addressed through improvements in tactics, weapons, even by funding added personnel. How many agencies, though, have taken a proactive position to study ways in

which they might capitalize on emerging technology to provide a greater level of safety to line level police officers through the uniform they wear?

This article will examine the importance of uniform advances for the purpose of safeguarding the individual officer and address the following questions:

- What does the police uniform consist of and why is the uniform important?
- What is the history of advances in the police uniform?
- Why is there an even greater need to concentrate on this subject?
- What research and development is currently taking place?
- What are some associated costs and potential available funding sources?

**The Police Uniform**

The modern police uniform consists of several components: fabrics, ballistic protection, restraint devices, lethal and less-lethal weaponry, communication devices, information technology, and, most recently, personal protective equipment. All of these components are designed to provide a high level of safety for the individual officer and to improve his/her effectiveness as a first responder within the community. In addition, the uniform enables officers to be easily identified by members of the community. As an icon, the uniform is readily distinguishable by others; to its wearer, it may also be the last and best way to be equipped not only to do their jobs, but to provide added safety in that pursuit.

**Uniform/Officer Safety**

Does the police uniform and individual equipment play a role in officer safety? The obvious answer is "Yes", but a review of FBI nationwide information may help paint a clearer picture of this question. According to the FBI Uniform Crime Report (UCR), 57 law enforcement officers were feloniously killed in 2004. 39 of the 57 officers were working a patrol assignment at the time of their death and 31 were wearing body armor. Thirteen of the officers who were wearing body armor died from torso wounds caused by bullets entering their bodies despite wearing the ballistic vest. Finally, 13 officers died as a result of blunt trauma to the head.[1] Can future advances in ballistic protection and the probability of officers wearing head protection have an effect on these numbers?

Not only are officers killed, but they are assaulted at an alarming rate. In 2004, more than 59,000 officers were assaulted while performing their duties, which resulted in 16,563 injuries. 80 percent of the injured officers were assaulted while working in a patrol assignment. Use of personal weapons (i.e. hands, fists, and feet) by offenders accounted for 80 percent of the total number of assaults.[2] What effect might current (i.e. taser) and future technologies have on these numbers?

Based upon the rate of death and injury suffered by law enforcement officers nationwide, the Division of State Associations of Chiefs of Police (SACOP) initiated a committee to examine the problem of officers killed in the line of duty in 2002. SACOP, a Division of the International Association of Chiefs of Police (IACP), eventually named the project

[1] www.fbi.gov, Law Enforcement Officers Feloniously Killed
[2] www.fbi.gov, Law Enforcement Officers Assaulted

"SafeShield" and directed its efforts towards research and development of the individual police uniform and related equipment. In 2003, the committee conducted a nationwide survey to examine officer injuries on a national scale and to identify potential means of reducing injuries. A total of 698 law enforcement agencies, representing 28 states, responded to the survey. More than 2800 on-duty injuries were reported during the rating period (calendar year 2002), resulting in about 24,000 lost work days. The types of injuries identified suggested that improvements in uniform design, equipment, training, and policies could prevent or mitigate the severity of many of the injuries. The survey also identified that the law enforcement community had a financial incentive to investigate changes in the equipment and uniforms worn by the individual officer.[3] Although significant attention has been given to the safety equipment and weapons with which the officer performs their duties, less effort has been devoted to possible improvements in the "passive" protective capacity of their uniform. Interestingly, that may be about to change.

**Evolution of the Uniform**

The history of the police uniform can be traced as far back as 1829 to the "Bobbies" of the London Metropolitan Police. They wore dark blue paramilitary-style uniforms. The color was chosen to distinguish them from the British military, who wore red and white uniforms at the time. The City of New York established the first official police force in the United States in 1845. In 1853, the New York Police Department (NYPD) adopted the dark blue uniform based upon the uniform worn by the London police. Other large

[3] SafeShield IACP Power Point Presentation, August 2006

eastern cities quickly followed in their footsteps by adopting the dark blue paramilitary style uniforms.[4]

In addition to the uniform clothing, individual uniform equipment has evolved over time to the following modern day equipment carried by law enforcement officers;

- Body Armor
- Less-Lethal and Lethal Weaponry
- Communication Devices
- Information and Communication Technology
- Personal Protective Equipment

It is useful for the reader to gain a sense of the evolution of each of these to fully appreciate how quickly some were integrated into service, while others matured over a longer time frame.

**Body Armor**

Certain types of body armor were used in the United States during the early 1900s, including bullet proof vests in the 1930s. The initial models were ineffective, cumbersome, and costly to mass produce. The discovery of new fibers in the 1960s led to a dramatic improvement in protective equipment and the development of today's concealable body armor. "The National Institute of Justice (NIJ) research identified new materials that could be woven into a lightweight fabric with effective ballistic resistant properties. NIJ's greatest leap in technology research focused around the development of

[4] www.PoliceOne.com, The Psychological Influence of the Police Uniform, March 2005

lightweight body armor that employed Dupont's *Kevlar* ballistic fabric into the prototypes."[5]

**Less Lethal and Lethal Weaponry**

Six general categories of less-than-lethal weapons currently exist or are in development: electrical shock, chemical, impact projectile, physical restraint, light, and acoustic. Most of the research involving law enforcement's use of less-lethal weaponry traces back to the 1960s and 1970s. "Research into less-than-lethal technologies has a long history in the Department of Justice. The first conference on the subject was convened by the Attorney General and the National Science Foundation in 1972. In 1986, then-Attorney General Edwin Meese convened a second national conference on less-than-lethal technologies in response to the U.S. Supreme Court decision *Tennessee v. Garner*, which limited the permissible use of deadly force against felons."[6]

**Handguns**

In the lethal arena, most law enforcement agencies issued revolvers until the 1970s, mostly due to safety concerns relating to the single-action firing capability of semi-automatic handguns. During the 1970s and 1980s, many of the top handgun manufacturing companies began producing semi-automatic handguns with a safer double-action capability. Because of this innovation, the majority of the law enforcement profession transitioned over the last 20 years from the use of revolvers to the use of semi-automatic handguns. Handgun accessories have also evolved with the advent of technology (i.e. night sites, laser grips, etc.).

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[5] www.interamer.com, History of Body Armor, 2005

[6] National Institute of Justice, Statement before subcommittee, The Honorable Sarah V. Hart Director, May 2002

### Communication Devices

During the mid 1930s and early 1940s, law enforcement agencies in the United States began communicating by use of two-way radios in patrol vehicles. However, it wasn't until the late 1960s and early 1970s that many agencies began issuing two-way radios, or "walkie-talkies," as a piece of individual communication equipment. Pagers and cellular phones followed this technology, becoming commercially available in the mid 1980s. All of these devices afforded greater opportunity for communication without the restrictions of a base station.

### Information and Communication Technology

"Information and Communication Technology (ICT) is the technology required for information processing. The definition of ICT is the use of electronic computers and computer software to convert, store, protect, process, transmit, and retrieve information from anywhere, anytime."[7] Computer technology has had a significant effect on the police uniform in the recent past. Although many of the advances in technology are not directly worn upon the uniform, information can be relayed to and from the individual officer through the use of Global Positioning System coordinates (GPS), audio and video recordings, and handheld Personal Digital Assistants (PDAs).

### Personal Protective Equipment

Outfitting first responders with Personal Protective Equipment (PPE) received considerable attention in the mid 1990s with the passage of the Nunn-Lugar-Domenici legislation and the development of the Metropolitan Medical Response System (MMRS). In the aftermath of the Sarin poison gas attack in Tokyo and the Oklahoma City bombing, Congress passed Public Law 104-201, the National Defense Authorization Act for Fiscal

[7] www.wikipedia.org, February 2006

Year 1997. The bill included an amendment by Senators Nunn, Lugar, and Domenici entitled the Defense Against Weapons of Mass Destruction Act. The Nunn-Lugar-Domenici amendment charged Federal departments and agencies with achieving the goal of putting systems into place that would protect the public against terrorists.[8] The terrorist attacks of September 11, 2001, significantly changed the priority of providing this type of equipment to first responders. This was reinforced with the creation of the Department of Homeland Security in 2002.

Based upon the historical review of the police uniform and individual equipment, it is clear that the current generations of law enforcement officers are better equipped than officers of the past. Will this trend continue and what effect will possible future events have on this issue? Terrorist events, pandemics, and severe weather disasters are just a few of the possible future events which could drive the need for further advances in the police uniform.

**Current Status of Research and Development**

Is there anything being done today? Actually, there are several significant programs that are conducting important research and development which may directly benefit officers working the front line. As one might expect, the U.S. Military has taken a leading role in advancing uniforms and related equipment to provide an additional margin of safety for its soldiers deployed across the world. Law enforcement has traditionally benefited and followed in the footsteps of those military advances that have proven to be successful and "battlefield tested." It is no surprise that a majority of the research and development is

[8] www.fas.org, Federation of American Scientists, Domestic Preparedness, January 1999

geared to soldiers, but some law enforcement groups are also mirroring these efforts. Based upon the research and development currently being conducted, the following are some examples of possible future advances for use in policing:

- The development of liquid armor providing maximum protection
- A ballistic helmet that also serves as a wearable computer providing situational awareness and all the advantages of information technology
- Thermal sensors woven into the fabric of the uniform for temperature control, medical monitoring, and WMD detection
- A skeletal system that allows the soldier to carry an extraordinary amount of weight
- Integrated PPE allowing for instant protection against WMD
- A comfortable, form-fitting uniform fabric that has the ability to blend in with any environment

A more in-depth review will allow you to imagine the uniform of the future beyond that already mentioned. Amongst the myriad of projects underway, the following are perhaps the most promising for adaptation by the police.

**U.S. Army Future Force Warrior Program (FFW)**

This is the premier program in the country and it is used as a resource by most of the other research and development programs. The Natick Soldier Center (NSC), located in Natick, Massachusetts, leads the Future Force Warrior Program. The goal of the center and the program is to conduct research and development for the purpose of maximizing a soldier's survivability, sustainability, mobility, combat effectiveness, and quality of life. Each aspect of the soldier's uniform is examined for the purpose of creating a fully

integrated set of systems tailored to each individual soldier. This includes the combat uniform, headgear, weaponry, physiological status monitor, micro-climate conditioning, and advanced power generation. Advances being studied by this program include:

- A ballistic helmet outfitted with a wearable computer allowing for immediate situational awareness and a host of information data bases.
- A skeletal system allowing soldiers the ability to carry extraordinary amounts of equipment.
- Uniforms equipped with sensors woven into the fabric providing medical monitoring, temperature control and WMD detection.
- A comfortable, form-fitting uniform fabric that has the ability to blend in with any environment.

**Defense Advanced Research Projects Agency (DARPA)**

DARPA was established in 1958 for the purpose of preventing technological surprise to the United States. This still holds true, but DARPA's mission now also includes the creation of technological surprise to be used against enemies. Essentially, DARPA is an unrestricted "think-tank" which attempts to develop advances in support of the military. DARPA attempts to accomplish this by maintaining an entrepreneurial atmosphere with its program managers so that they can develop radical innovations to aid in national security. Program managers are selected based upon expertise and generally only retained for a period of four to six years so that the expertise and synergy does not become stale. DARPA is a defense agency that is not tied to a specific operational mission, but rather provides technological options for the entire Department of Defense.[9]

[9] www.darpa.mil, DARPA's Strategic Plan, February 2005

An example of their creativity is the January 2006 development of a "Radar Scope." The handheld scope, which can be carried upon the individual uniform, has the capability of sensing movement as small as breathing through 12 inches of concrete. The device works by simply holding it up against a wall and viewing the scope.[10]

**Law Enforcement Advanced Protection (LEAP)**

"LEAP" is a Department of Homeland Security (DHS) Office of Science and Technology sponsored, multi-agency program. This program spearheads a national effort to address multi-hazard protection in an integrated systems approach. The purpose of the program is to address related standards, system requirements, and performance of an integrated protective ensemble for homeland operations."[11] The program essentially is under the umbrella of the Future Force Warrior Program, but it is geared to developing standards and equipment for use by domestic law enforcement. The program has researched the development of current personal protective equipment generally used by law enforcement tactical teams. It identified the difficulties associated with conducting tactical operations in the current oversized plastic hazmat suites and directed it efforts towards developing a more user-friendly protective suit. One example developed by engineers was an over-under hybrid concept where the protective suit was worn concealed at the officer's waist level, similar to the look of a spare tire. In the case where a protective suit needed to be deployed, the officer would remove his or her personal equipment and don the suit. The officer would then place his or her individual equipment over the protective suit.[12]

**The Institute for Soldier Nanotechnologies (ISN)**

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[10] AFIS news article, Donna Miles, American Forces Press Services, January 2006
[11] www.natick.army, Law Enforcement Advanced Protection, February 2006
[12] www.defenselink.mil, U.S. Army News Article, December 2004

"The Institute for Soldier Nanotechnologies (ISN) is an interdepartmental research center at MIT. Established in 2002 by a five-year, $50 million contract from the U.S. Army, the ISN's research mission is to use nanotechnology to dramatically improve the survival of soldiers. The ultimate goal is to create a 21st century battlesuit that combines high-tech capabilities with light weight and comfort. Imagine a bullet-proof jumpsuit, no thicker than ordinary spandex that monitors health, eases injuries, communicates automatically, and maybe even lends superhuman abilities. It's a long-range vision for how technology can make soldiers less vulnerable to enemy and environmental threats."[13] In a civilian setting, the police officer of the future will be able to work under severe conditions for longer periods of time before becoming fatigued or ill. The medical monitoring devices will notify officers when they need to take on fluids, nutrition, or medications. Clarity of thought, decision making skills and the reduced need for personnel exchange could all be benefits of this type of uniform advance.

**Potential Costs and Funding Sources**

What is all this going to cost? There is no doubt that this would be the first question out of the mouth of the Chief! The initial cost of some of the uniform safety equipment may or may not be exorbitant depending on the size of an agency's budget and the item in question. However, costs related to training and Occupational Safety and Health Administration requirements, equipment repair and integration, and replacement needs may drive up the price substantially. Although some pieces of technology are rapidly becoming more affordable, such as HUDs, other items remain consistently expensive (e.g., ballistic protection and personal protective equipment).

[13] www.web.mit.edu, Institute for Soldier Nanotechnologies, February 2006

The Motion Research Corporation has developed a Heads Up Display, appropriately called the "SportVue," for recreational motorcycle and bicycle helmets. The user views a real time display of critical data driven by a compact GPS transceiver, which projects the information into the field of vision. The cost of the unit ranges from $250 to $500 depending upon the model.[14] It is not hard to imagine a similar HUD being developed for law enforcement use that stays in the same price range. On the opposite end of the spectrum, the estimated cost to outfit a single tactical officer in a complete level B MSA Blackhawk protective suit (Self Contained Breathing Apparatus) is approximately $5,500. This does not include costs for initial and annual training or the required medical screening, which can realistically be estimated at $2,000 per student.[15]

Throw those types of numbers in front of a police executive and the next question will most certainly be, "Where can we find that kind of money?" The best answer is to be creative and examine all possible sources. The Office of Homeland Security has directed a large amount of money toward law enforcement; however, it is not uncommon for local agencies to receive little or none of the funding. This is generally a result of the funding being funneled through larger entities such as state and county agencies. To have any influence over the direction of the funding, an agency must commit to staying involved with the grant process. There are some grants that are offered by private corporations or non-profit groups that local agencies can obtain.

[14] www.gizmag.com, Retro-fit heads-up display system, news article, 2004
[15] Fremont Police Department memorandum estimating level B costs, June 2006

Examples of grants or similar alternate funding streams include grants offered by the National Tactical Officers Association and private corporations such as DuPont. Teaming up with neighboring agencies and applying for regional grants is another strategy that can be effective. Partnering with non-traditional entities can also aid in funding uniform advances. For instance, the Fremont Police Department partnered with the City's Risk Management Division to purchase Tasers for the entire Patrol Division. The estimated cost savings in the reduction of officer injuries sustained while using physical force helped persuade the Risk Manager to pay for a large portion of the purchase cost.

**Summary**

It is probably not realistic to believe that advances in the police uniform will occur at a rapid pace across the country. However, it is not unrealistic to believe that individual agencies and specialized units will benefit from uniform advances in the near future. Each agency will have to determine what potential risks their officers face and how they will prioritize providing a measure of safety. This will depend on environmental concerns and potential hazards within each jurisdiction. An urban SWAT Team concerned about the ability to function in a contaminated environment may focus on advances in PPE, while a rural sheriff's office in an area known for flooding may focus on advances that would provide a margin of safety under those circumstances. Funding will play a large part in the "speed to market" of advances, but so too will the interest and involvement of law enforcement agencies across the nation. The military has set the standard in research and development of uniform and equipment advances for soldiers. It

is up to the law enforcement leaders of today to follow in these footsteps for the well-being of those officers working on the front line.